

**WHAT IS CLAIMED IS:**

- 1           1.     A rapid feed paintball loader for use on a paintball gun, the  
2 paintball loader comprising:
  - 3           a container for holding a plurality of paintballs;
  - 4           a paintball agitating device mounted on a bottom portion of the  
5 container;
  - 6           a motor that rotates the paintball agitating device;
  - 7           an exit tube exiting from the bottom portion of the container and  
8 leading to an inlet tube of the paintball gun;
  - 9           a tube extension mounted on an interior surface of the container  
10 adjacent to the exit tube;
  - 11          a deflector for deflecting paintballs downward into the gaps  
12 between the fins or upward to pass over the tube extension, said deflector  
13 pivotably attached to the interior surface of the container adjacent to the  
14 tube extension, said deflector being mounted at a height above a top  
15 surface of the agitating device and below a bottom portion of the tube  
16 extension; and
  - 17          means for actuating the motor upon demand.

1           2.     The rapid feed paintball loader of claim 1 wherein:  
2           the paintball agitating device includes:  
3                 a drive cone rotatably mounted on a bottom portion of the  
4     container, said drive cone having a top feed surface that slopes downward  
5     from a center axis of said drive cone; and  
6                 a plurality of fins affixed to the top feed surface of the drive  
7     cone, each fin having a top feed surface and forming a gap with an  
8     adjacent fin large enough to accommodate a paintball;  
9           the exit tube includes a sloped exit portion; and  
10          the tube extension is mounted at a height which is above the top  
11     feed surface of the fins and having a radius of curvature that is  
12     approximately equal to the radius of a paintball.

1           3.     The rapid feed paintball loader of claim 2, wherein the motor  
2     is a DC electric motor.

1           4.     The rapid feed paintball loader of claim 2, the means for  
2     actuating the motor upon demand includes a detector for detecting a  
3     presence of paintballs at a selected position within the exit tube.

1           5.     The rapid feed paintball loader of claim 4, wherein said  
2 means for actuating the motor upon demand includes a microprocessor  
3 which variably controls a speed of the motor, said microprocessor  
4 decreasing the speed of the motor when receiving a signal from the  
5 detector that the presence of paintballs is detected in the exit tube and  
6 increasing the speed of the motor when receiving a signal from the  
7 detector that paintballs are not present in the exit tube.

1           6.     The rapid feed paintball loader of claim 4, wherein said  
2 detector is a reflective infrared optical sensor.

1           7.     The rapid feed paintball loader of claim 4, wherein said  
2 detector is an optical sensor.

1           8.     The rapid feed paintball loader of claim 4, wherein said  
2 detector is an electro-mechanical switch.

1           9.     The rapid feed paintball loader of claim 4, further comprising  
2 a microprocessor communicating with the detector and the motor.

1           10. The rapid feed paintball loader of claim 9 wherein said  
2 microprocessor momentarily stops the motor when said microprocessor  
3 detects a specified increase in torque output from the motor.

1           11. The rapid feed paintball loader of claim 10, further  
2 comprising a display positioned on the container and wherein said  
3 microprocessor displays relevant data to an operator of the paintball gun  
4 on the display.

1           12. The rapid feed paintball loader of claim 11, wherein said  
2 display includes a timer.

1           13. The rapid feed paintball loader of claim 12 wherein said  
2 timer emits an audio warning after a preselected time has elapsed.

1           14. The rapid feed paintball loader of claim 12 wherein said  
2 timer displays a visual warning after a preselected time has elapsed.

1           15. The rapid feed paintball loader of claim 12 wherein said time  
2 provides a vibratory alert after a preselected time has elapsed.

1           16. The rapid feed paintball loader of claim 4, wherein said  
2 means for actuating the motor upon demand includes a microprocessor  
3 which disengages the motor when receiving a signal from the detector that  
4 the presence of paintballs is detected in the exit tube.

1           17. The rapid feed paintball loader of claim 16 wherein said  
2 microprocessor momentarily reverses a rotational direction of the motor  
3 when said microprocessor detects a specified increase in torque output  
4 from the motor.

1           18. The rapid feed paintball loader of claim 2 wherein the sloped  
2 exit portion has a slope approximately equivalent to the slope of the top  
3 feed surface of the drive cone.

1           19. The rapid feed paintball loader of claim 2 wherein the exit  
2 tube is horizontally orientated approximately 45 degrees from a horizontal  
3 axis running through a mid-position of the paintball loader.

1           20. The rapid feed paintball loader of claim 2 wherein the  
2 plurality of fins spiral outwardly from an interior dome-shaped area  
3 located within the center of the drive cone.

1           21. The rapid feed paintball loader of claim 2 wherein said  
2 plurality of fins spiraling outwardly from an interior area of the drive  
3 cone.

1           22. The rapid feed paintball loader of claim 1 further comprising:  
2 a detector for detecting a presence of paintballs at a selected  
3 position within the exit tube; and  
4 a microprocessor communicating with the detector and the motor.

1           23. The rapid feed paintball loader of claim 22 further  
2 comprising a display positioned on the container and wherein said  
3 microprocessor displays relevant data to an operator of the paintball gun  
4 on the display.

1           24. A rapid feed paintball loader for use on a paintball gun, the  
2 paintball loader comprising:  
3           a container for holding a plurality of paintballs;  
4           a plurality of fins located at a bottom portion of the container, each  
5 fin having a top feed surface and forming a gap with an adjacent fin large  
6 enough to accommodate a paintball;  
7           means for rotating the plurality of fins about an axis running  
8 perpendicularly through the bottom portion of the container;  
9           an exit tube exiting from the bottom portion of the container and  
10 leading to an inlet tube of the paintball gun, said exit tube having a sloped  
11 exit portion;  
12           a tube extension mounted on an interior surface of the container  
13 adjacent to the sloped exit portion of the exit tube, said tube extension  
14 being mounted at a height which is above the top feed surface of the fins  
15 and having a radius of curvature that is approximately equal to the radius  
16 of a paintball;  
17           a deflector for deflecting paintballs downward into the gaps  
18 between the fins or upward to pass over the tube extension, said deflector  
19 pivotably mounted on the interior surface of the container adjacent to the  
20 tube extension, said deflector being mounted at a height which is above  
21 the top feed surface of the fins and which is below a bottom portion of the  
22 tube extension;

23           a motor that rotates the drive cone; and  
24           means for actuating the motor upon demand.

1           25.   A rapid feed paintball loader for use on a paintball gun, the  
2           paintball loader comprising:  
3               a container for holding a plurality of paintballs;  
4               a paintball agitating device mounted on a bottom portion of the  
5           container;  
6               an exit tube exiting from the bottom portion of the container and  
7           leading to an inlet tube of the paintball gun;  
8               a motor that rotates the paintball agitating device; and  
9               means for actuating the motor upon demand, said means for  
10          actuating the motor upon demand including:  
11               a detector for detecting a presence of paintballs at a selected  
12          position within the exit tube; and  
13               a microprocessor which variably controls a speed of the  
14          motor, said microprocessor decreasing the speed of the motor when  
15          receiving a signal from the detector that the presence of paintballs is  
16          detected in the exit tube and increasing the speed of the motor when  
17          receiving a signal from the detector that paintballs are not present in the  
18          exit tube.